

# Home aquarium species a potential threat to California waters

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The highly invasive lionfish is easily available through aquarium and internet sales and represents a potential threat for California waters. Though not known to infest California waters, its ability to tolerate cool temperatures mean it could establish as far north as San Francisco Bay and beyond if released, according to a UC Davis Bodega Marine Laboratory report. Credit: Christian Mehlhuehrer

(Phys.org)—Well-intentioned children and aquarium hobbyists seeking to "free" their pet fish down a toilet bowl or into a local waterway may inadvertently be contributing to the threat of invasive species

downstream, according to a new report from the University of California, Davis.

In a report released today to the California [Ocean Protection](#) Council, lead author Susan Williams, an evolution and ecology professor with the UC Davis Bodega Marine Laboratory, found that more than 11 million non-native ornamental marine individuals—such as [tropical fish](#), seaweed and snails bound for aquariums—representing at least 102 [species](#) are being imported annually through California's ports of San Francisco and Los Angeles, primarily from Indonesia and the Philippines. And 13 of those species have been introduced to California marine waters—presumably after being released from aquariums.

While that number is low, the report cautions that 69 percent of the introduced species established themselves successfully in California, signaling a potential threat to [marine ecosystems](#). Some non-native, invasive species can rapidly spread and outcompete native species for food and habitat.

"Although relatively few aquarium species have been introduced compared to species in other pathways, such as [ballast water](#), they are highly successful because they're grown to be hardy and robust," Williams said. "They have to be tough to survive in the trade."

The aquarium trade represents a \$1 billion a year global industry and a popular home hobby, second only to photography, the report said. It has also introduced some of the world's worst invasive species, such as the seaweed *Caulerpa*, the "killer algae" that infected two lagoons in Southern California in 2000 and cost California more than \$6 million to eradicate.

Another invader is the highly predatory [lionfish](#), which regularly enters the state's ports through the aquarium trade—20 lionfish were imported

into San Francisco International Airport on a single day, the report said. Introduced to Florida in 1999, it spread rapidly throughout the Caribbean Sea and along the East Coast by 2010. Lionfish have not been reported in California waters, but the fish is able to withstand cooler temperatures. If released, a lionfish could establish itself as far north as San Francisco Bay and, even farther, as oceans continue to warm, the report said.

While the report highlighted lionfish and *Caulerpa* as species of special concern, it identified at least 34 species deemed able to tolerate California's current marine climate.

The report is one of six that the UC Davis Bodega Marine Laboratory coordinated for the state, each exploring a different vector, or pathway, through which [invasive species](#) can enter California ocean waters. The other pathways include aquaculture, live seafood, live bait, fishing vessels and recreation vessels. Williams said it makes sense to focus on invasive threats from the aquarium trade because they can be managed primarily through public education, with minimal regulatory action or expensive measures.

"Unlike some other vectors, we can easily prevent unwanted introductions from the aquarium trade," she said. "Aquarium hobbyists can follow some simple practices—like 'Don't dump your aquarium'—to avoid releasing aquarium species into natural water where they can become an expensive and harmful pest." Williams said that people who no longer want an aquarium species can contact the vendor from which the species came or the California Department of Fish and Wildlife (formerly called California Department of Fish and Game) to learn how to dispose of or return it responsibly.

For the risk assessment, researchers analyzed state and federal agency databases of non-native species associated with ornamental aquariums,

as well as U.S. Fish and Wildlife Service inspection records for live animals imported into California ports, and state permit records for restricted species. The researchers also observed a routine, one-day inspection of live organisms arriving in air cargo at San Francisco International Airport for a snapshot view of the inspection process.

The scientists discovered several data limitations: Regulatory agencies do not track the ultimate destination of the aquarium species once they clear customs, so it is unknown how many species stay in California once they arrive.

Both *Caulerpa* and lionfish are also readily available for sale over the Internet, which presents a data gap for researchers and a regulatory challenge for agencies.

Further, regulatory authority for the trade is fragmented across state and federal agencies, and there is no central source of information on the species, regulations, permits or other relevant records.

"From the hobbyist or industry side, it is really hard to figure out the rules and regulations for holding live organisms in the state—for importing, possessing and trading them," said Williams. "So one of our conclusions is that a more centralized information and permitting system would benefit the regulators, industry and hobbyists, and enable scientists to collect more information and better assess the risk."

**More information:** [calost.org/pdf/science-initiat ...  
OrnamantalReport.pdf](https://calost.org/pdf/science-initiat...OrnamantalReport.pdf)  
[calost.org/science-initiatives ... tic-invasive-species](https://calost.org/science-initiatives...tic-invasive-species)

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